

# Green Power Market Dynamics and Outlook

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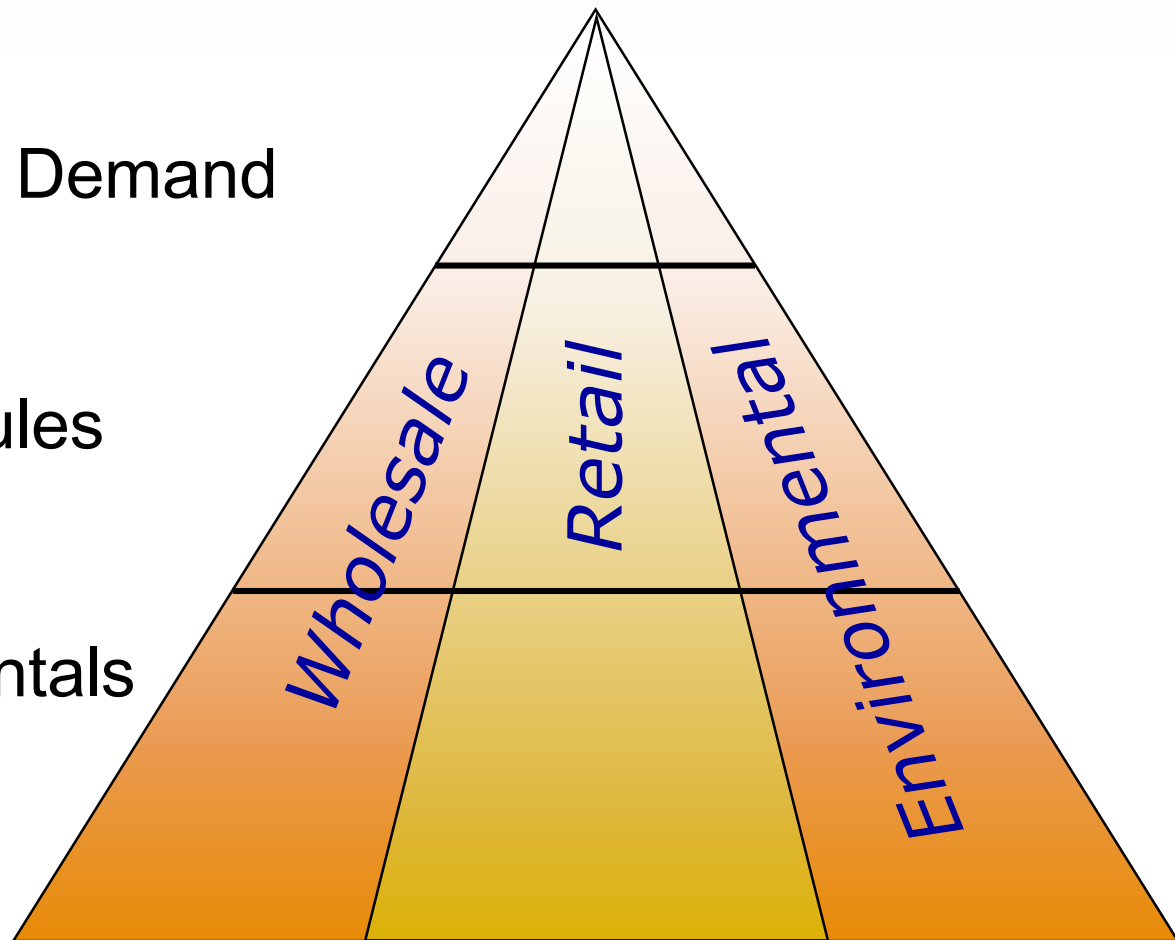
**October 04, 2004**

# Renewable Retail Market Framework:

3. Customer Demand

2. Market Rules

1. Fundamentals



# Renewables Market Fundamentals

## ■ Wholesale

- ❖ Oil @ \$50/barrel: low spare production & inventory
- ❖ Gas futures > \$7/MMBtu (Jan '05)
- ❖ LNG & coal: no impact < 2010
- ❖ Terrorism
- ❖ Wind turbine scale efficiencies
- ❖ PV manufacturing plant scale efficiencies
- ❖ Merchant plant project financing criteria

# Renewables Market Fundamentals

## ■ Retail

- ❖ Accounting systems
- ❖ 52,000 MW year-end 2003: > RTO size
- ❖ > 40 new retail suppliers (generic) 2002-2004
- ❖ Short-term / real-time pricing default service/POLR

## ■ Environmental

- ❖ Weather patterns
- ❖ Air quality

# Renewables Market Rules

## ■ Wholesale

- ❖ PTC
- ❖ RTOs
- ❖ Wind Integration: economics, engineering, planning
- ❖ Resource adequacy
- ❖ Capacity Value
- ❖ Constraints to RPS compliance

# Renewables Market Rules

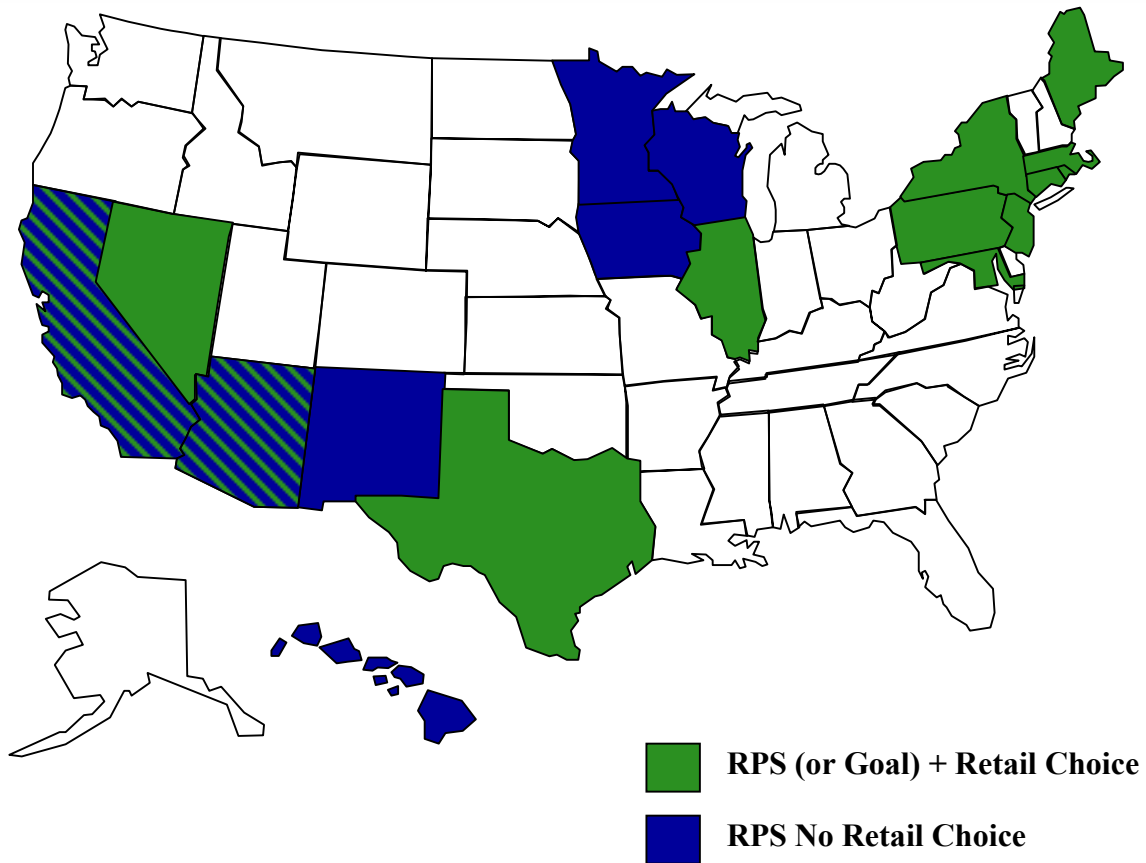
## ■ Retail

- ❖ Default service design
- ❖ Customer service rules
- ❖ Marginal rate level: 26.7 c/kWh PG&E GRC
- ❖ Net meter caps: per system and utility

# Renewables Market Rules

## ■ Environmental

- ❖ RPS: > 10 GW by 2010
- ❖ Kyoto
- ❖ States GHG rules
- ❖ Subsidies
- ❖ Other countries' goals





# Renewables Customer Demand

## ■ Wholesale

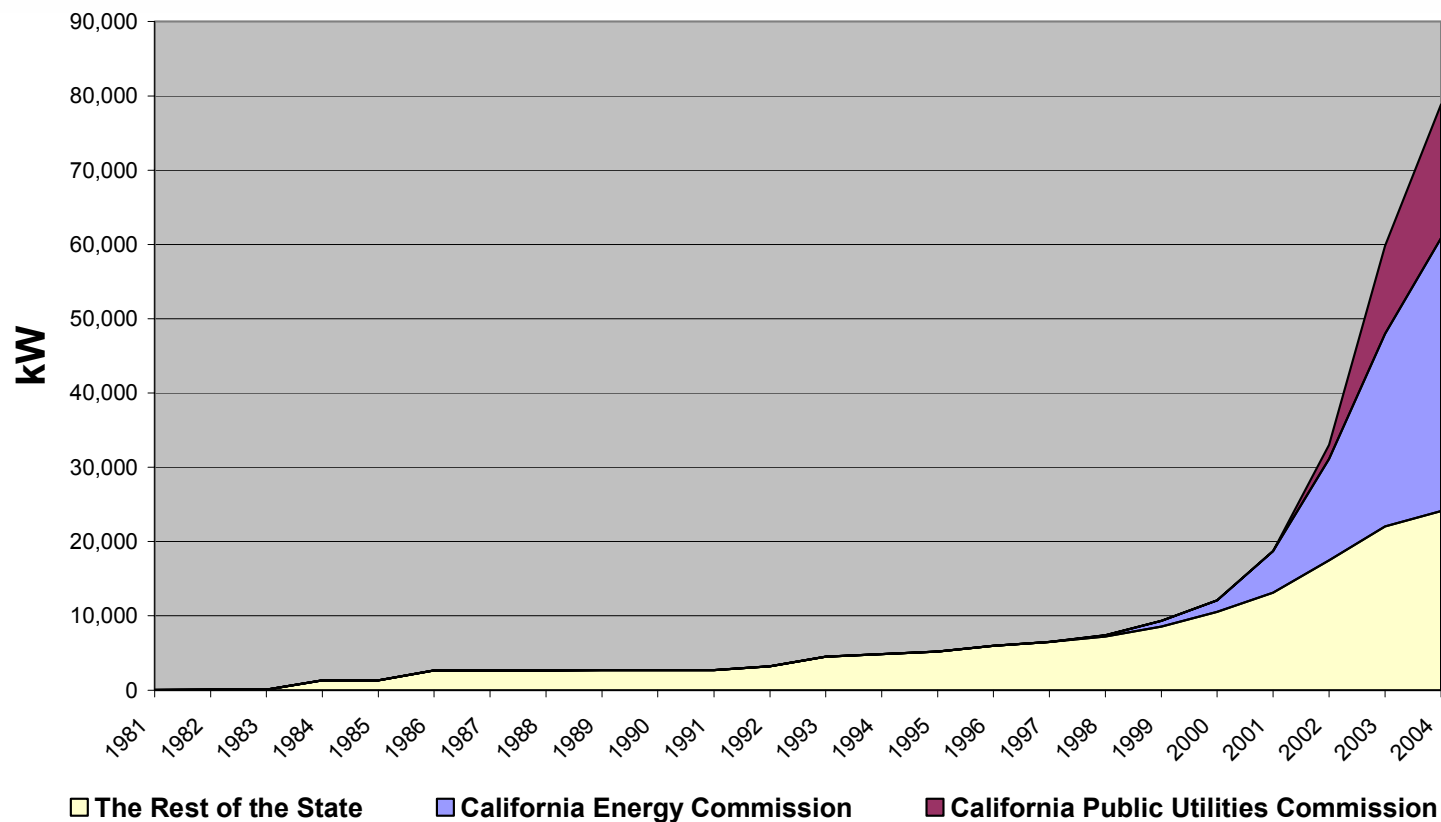
- ❖ 14,000 MW in Germany operating
- ❖ Substantial experience now outside CA
- ❖ FPL, AEP, Mid-American
- ❖ Nexen, CalPERS Greenwave, Cleantech
- ❖ CCAs considering renewables ownership

# Renewables Customer Demand

## ■ Retail

- ❖ Completing 7<sup>th</sup> year of electric choice
- ❖ Tag certification / acceptance
- ❖ Flex Your Power success
- ❖ Solar growth > 100% annually

## Grid-Connected PV Capacity Installed in California Cumulative



Source: CEC Amount (MW) of Grid-Connected Solar Photovoltaics (PV) in California, 1981 to Present  
[http://www.energy.ca.gov/renewables/emerging\\_renewables/2004-07-20\\_GRID\\_PV.XLS](http://www.energy.ca.gov/renewables/emerging_renewables/2004-07-20_GRID_PV.XLS)

# Renewables Customer Demand

## ■ Environmental

- ❖ Green building taking off
- ❖ Prius waiting list
- ❖ LOHAS market growth
- ❖ Green power sales in non-Austin Texas
- ❖ EPA's Green Power Partnership

# Renewables Customer Demand: GHG

- Business Roundtable: 70% of members voluntarily “taking part” in combating global warming
- The Conference Board, August 2004

“Given the increasing costs of, and uncertainties surrounding, the reliability of traditional energy sources and growing pressures for higher standards of citizenship and contributions to global sustainability, **businesses that ignore the debate over climate change do so at their peril.**”

# Renewables Retail Outlook

## ■ Fundamentals

- ❖ Gas prices will increase regulated retail rates
- ❖ Wind beats gas
- ❖ Wind integration timing will beat LNG and coal
- ❖ Solar closes retail price gap

## ■ Rules

- ❖ RPS = low risk investment relative to others
- ❖ Default service rules drive customer choice
- ❖ PV/DG obstacles: from nuisance to market inhibitor

# Renewables Retail Outlook

## ■ Demand

- ❖ Large customers are the near-term big MWh
- ❖ Renewables valued for no fuel risk resource
- ❖ Higher rates + reduced prices = PV growth
- ❖ Stranded cost conversation expands to T&D

# KEMA Renewable Energy Competencies

- Wholesale & retail market dynamics
- RECs accounting and trading
- Policy development and evaluation
- Customer programs implementation
- Green retailing strategy, evaluation
- Intermittent resource grid impacts
- European and Australian markets